



PN: 875-0066-01 RevB

NomadTM RFID Reader Setup Guide

<http://www.fuwit.com>

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PN: 700-0135-01 RevA
June, 2012

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Nomad RFID Reader Setup Guide

Introduction to the Nomad RFID Reader

The Nomad® RFID Reader and mounting kit lets users easily add UHF RFID capability to Trimble's popular Nomad rugged handheld PC. This reader allows handheld reading and writing of EPC Global Gen2 tags in the harshest outdoor environments. Like the Nomad itself, this accessory meets the rigorous MILSTD- 810F military standard for drops, vibration, humidity, altitude and extreme temperatures, and also has an IP67 rating. The reader is completely sealed against dust and can survive immersion in up to one meter of water for 30 minutes. Based on the best-in-class ThingMagic M5e Compact UHF RFID module, the reader is controlled by and powered from the Nomad handheld PC via USB interface. The reader accessory comes with drivers and software needed to immediately start reading EPC Gen2 tags, as well as a full SDK to allow developers to write their own custom applications in Windows Mobile.

This document covers the following:

- The Nomad RFID Reader hardware
- Assembling the Nomad RFID Reader hardware
- Downloading and installing the RFID SearchLight application
- Using the RFID SearchLight application

Related Documentation

For additional information about the Nomad Handheld PC:

http://www.trimble.com/Outdoor-Rugged-Computers/nomad.aspx?dtID=product_information

For more information about the ThingMagic's USB RFID Reader:

<http://www.thingmagic.com/usb-rfid-reader>

For more information about ThingMagic's M5e-C:

<http://www.thingmagic.com/embedded-rfid-readers/m5e-compact>

For support contact:

Support@Trimble.com

Nomad RFID Reader Hardware

Tools Required

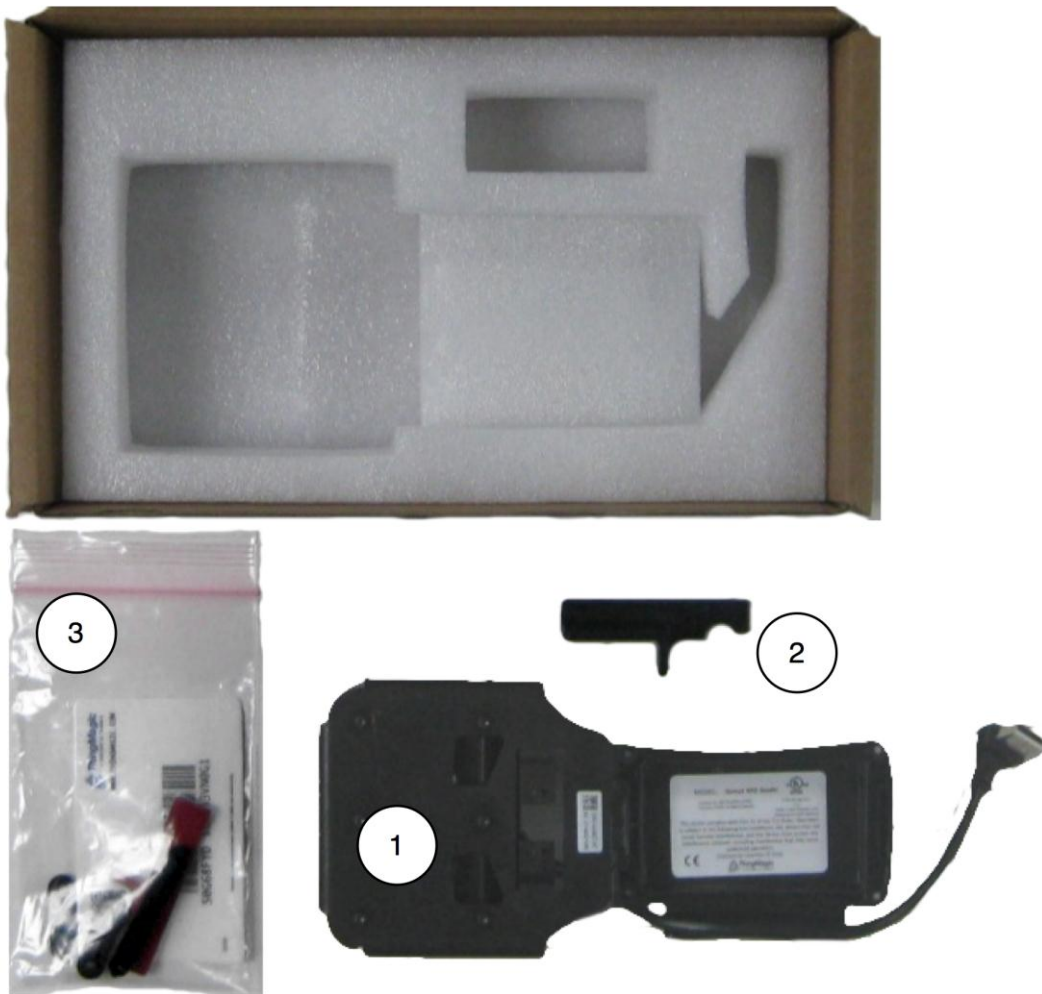
A small Phillips-head screwdriver is required.

Unpacking the Nomad RFID Reader

The package contains:

1. The Nomad RFID Reader assembly (#1 in the picture below)
2. A bumper to protect the USB port and cable from damage (#2 in the picture below)

3. A plastic bag containing a sample RFID tag, One spacer, and an adhesive strip for the bumper (#3 in the picture below)
4. A Quickstart Guide (not shown in the picture below)



Contents of the box

There is one plastic spacer in the plastic bag.

A. Spacer

The correct spacer you need depends on whether you have any other Nomad accessories.

1. If you **don't have** a WWAN/GPRS modem, you need the Spacer
2. If you **have** a WWAN/GPRS modem, you don't need any spacers.

WARNING: Make sure to identify the correct set of accessories and select the correct spacers. Failure to do this could cause the Nomad RFID Reader to be installed incorrectly and get damaged in the field.

NOTE: The following accessories are not compatible with the Nomad RFID Reader

<i>Nomad Deluxe case</i> <i>Nomad standard case</i> <i>Nomad AA battery pack</i> <i>Nomad Serial boot</i> <i>Nomad Pistol Grip</i>	<i>Nomad hand strap</i> <i>Nomad black nylon carry case</i> <i>Nomad range pole bracket</i> <i>Nomad vehicle mount</i>
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Downloading and Installing the RFID SearchLight Software

There are three methods to download and install the RFID SearchLight application.

WARNING: Do not connect the RFID Reader's USB cable until after the software installation is completed.

Use a USB FLASH drive

1. Download the package from <http://www.trimble.com/nomad-drivers> onto a USB FLASH drive connected to your PC
2. If connected, disconnect the Nomad RFID Reader from the USB port of the Nomad. Insert the USB FLASH drive into the USB port of the Nomad.
3. Using File Explorer, browse to the USB FLASH drive and click on RFIDSearchLightinstaller.CAB to begin the installation process.

Use Active Sync 4.5 or greater (Windows XP) or Windows Mobile Device Center (Windows Vista and Windows 7)

NOTE: If you are running MS Windows XP, use the Active Sync link provided here: <http://www.microsoft.com/en-us/download/details.aspx?id=15>. If you are running MS Windows Vista or 7, use Windows Mobility Device Center provided here: <http://support.microsoft.com/kb/931937>

1. Download the package from <http://www.trimble.com/nomad-drivers> onto a your PC's hard drive.
2. Connect the Nomad to the PC with a USB cable and follow the procedure to copy files over to the Nomad.
3. Click on RFIDSearchLightinstaller.CAB to begin the installation process.

Directly download the installer file to the Nomad

If your Nomad is connected directly to the Internet via WiFi or WWAN, you can use this method.

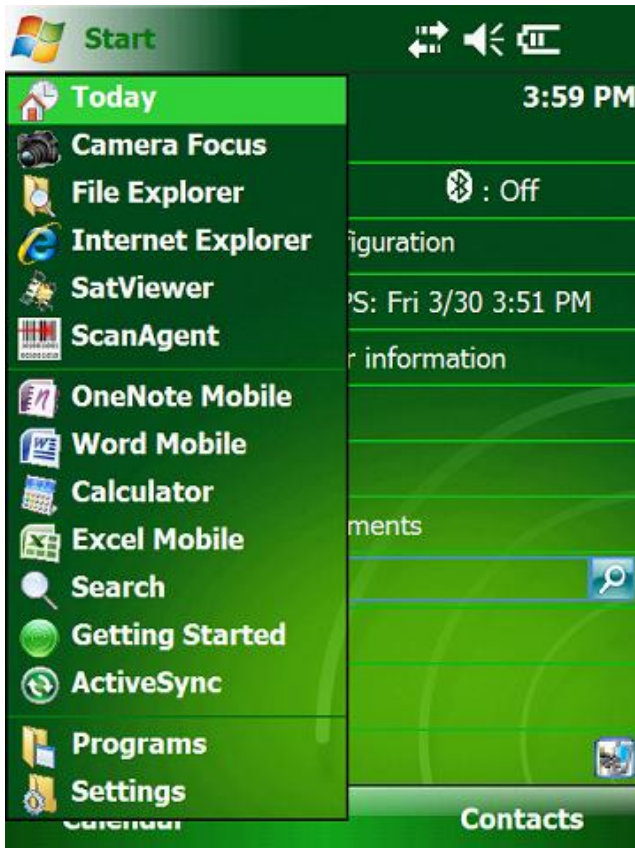
NOTE: Data charges may apply if you use this method over a Wi-Fi or WWAN connection.

1. Connect to the Internet.
2. In your browser, go to <http://www.trimble.com/nomad-drivers>.

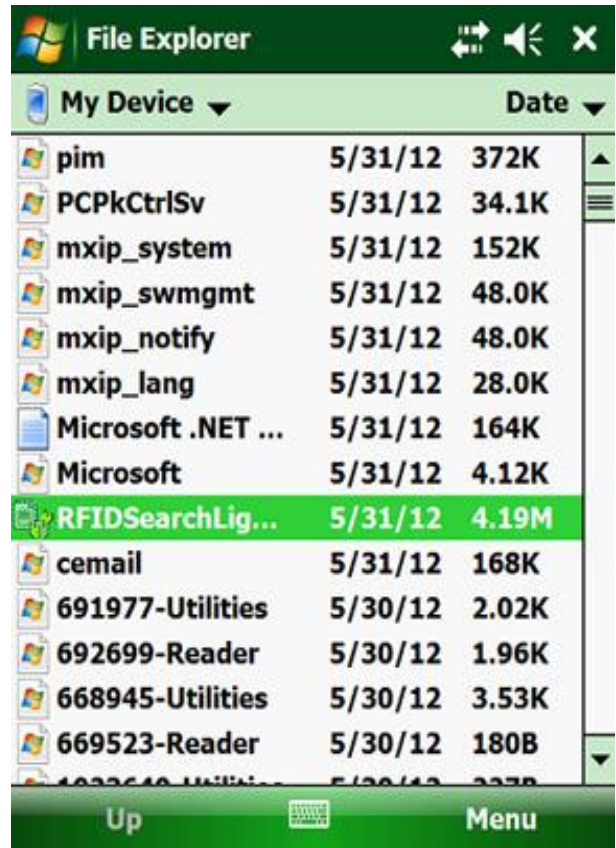


Internet Browser window

3. Click on **RFIDSearchLightinstaller.CAB** to start the download.
4. Once the download completes, click on **Start** button. The Start dropdown menu displays.
5. Click on **File Explorer**. The File Explorer directory displays.

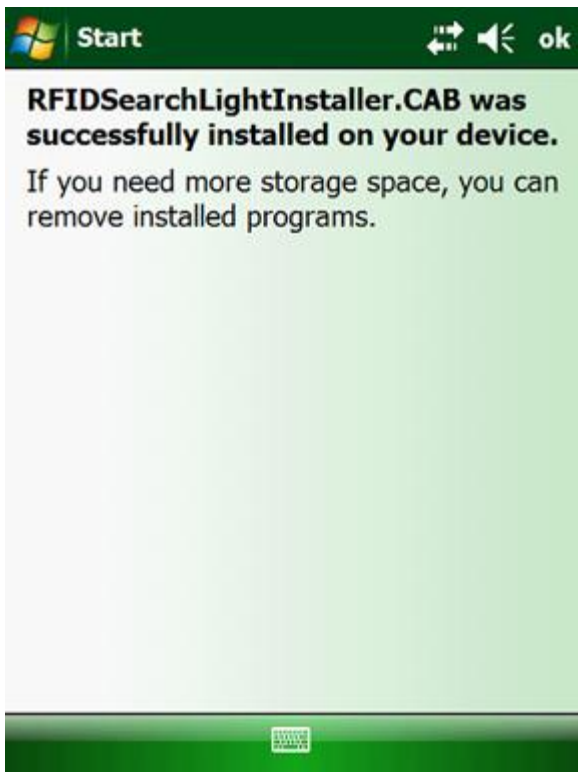


Start Dropdown Menu



File Explorer directory

- In the File Explorer, click on **RFIDSearchLightInstaller.cab**. The installation process steps through installing five files.



RFIDSearchLightInstaller.CAB window

The installer installs the following files:

- RFIDSearchLightInstaller.CAB
- RFIDSearchLight.CAB
- FtdiVcpInstaller.CAB
- NETCFv35.Messages.EN.wm.CAB
- NETCFv35.wm.armv4i.CAB

After each component is installed, you have to press "OK" in the top-right hand corner to install the next component.

NOTE: You **must** restart the Nomad after installation.

7. After each component is installed, click on the **OK** button in the upper right of each window. When the process completes, you must the restart the Nomad.
8. Click on the **Start** button in the Windows main menu. The Start dropdown menu displays.
9. Plug the RFID Reader's USB cable into the Nomad.
10. Go to the [Before Running the RFID SearchLight Software](#), before using the RFID SearchLight application.



Nomad connector panel (bottom of unit)



With RFID Reader connected to USB port.

Assembling the Nomad RFID Reader

1. All Documentation, Software and Firmware are available for download from:

<http://www.trimble.com/nomad-drivers> - Drivers

<http://www.trimble.com/nomadsupport> - Setup Guide

NOTE: The RFID SearchLight application must be installed on the Nomad Handheld in order to use the RFID reader. *Use of all software and firmware is governed by the then-current End User License Agreement or Shrinkwrap License Agreement (Software).*

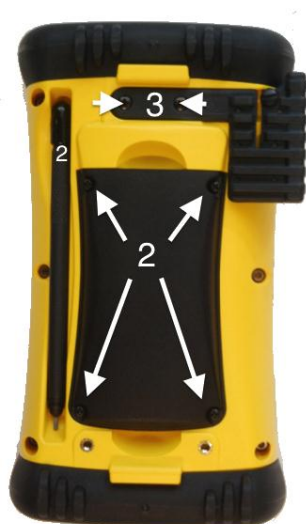
2. Remove existing battery door using Phillips-head screwdriver on stylus.



Back view with battery cover on



Back view with battery cover off

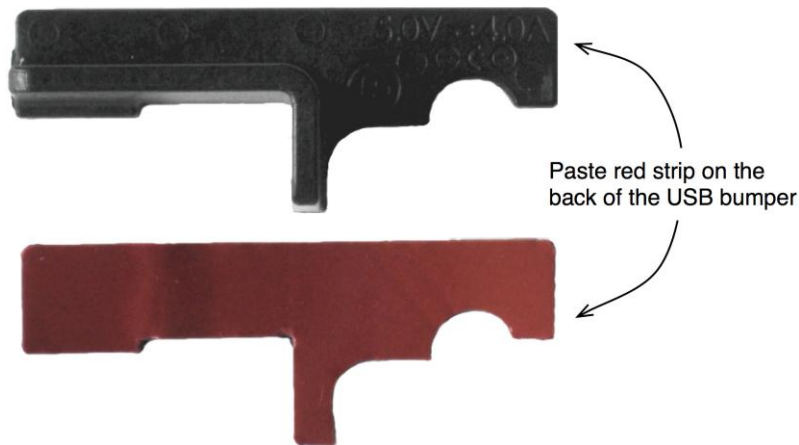


Removing the WWAN screws



Securing the Nomad RFID Reader

3. Remove screws from WWAN cellular antenna, if present. **WARNING: DO NOT remove the cellular antenna, it will damage the antenna.**
4. Attach Nomad RFID reader to battery door. Insert the Spacer first, if non-cellular device.
5. Ensure the reader cable is secured under the wire guide and allows the battery door to seat properly.
6. Screw six screws to secure unit: 4x battery door, 2x for WWAN antenna connection.
7. Install the USB protective bumper as shown below. Paste the supplied adhesive strip on the back of the USB bumper and firmly press the bumper onto the Nomad USB boot. The final assembly is also shown below.



Paste the supplied adhesive strip onto the back of the USB bumper.



Final assembly of the USB bumper before USB cable installation

8. Attach the USB cable to the Nomad USB boot. The final assembly is shown below.
WARNING: Do not connect the RFID Reader's USB cable until after the software installation is completed.



Final assembly of the USB bumper before USB cable installation

Before Running the RFID SearchLight Software

Before running the RFID SearchLight software, several Nomad features may be enabled. These include:

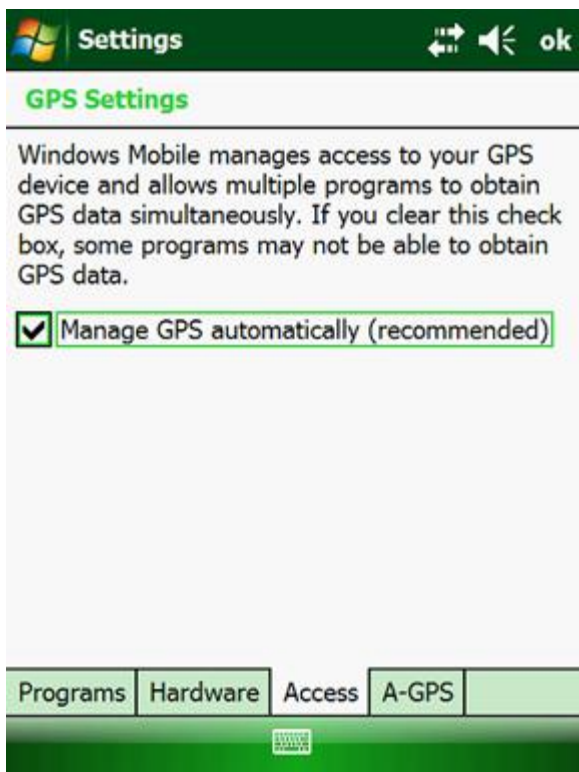
- GPS (If tag location desired)
- Local time zone

Enabling GPS

For all Nomads, follow these steps to turn on GPS:

NOTE: Please make sure SatViewer is not running in background. If it is, exit SatViewer and restart it after completing the following steps.

1. Click **Start**. The Start dropdown menu displays.
2. Click on **Settings**. The Settings window displays.
3. Click on the **System tab**.
4. Click on the **GPS** icon. The GPS Settings pane displays.
5. Click on the **Access** tab. The GPS Settings Access tab displays.
6. Check the check box **Manage GPS automatically (recommended)**. A check mark displays.



GPS Settings tab

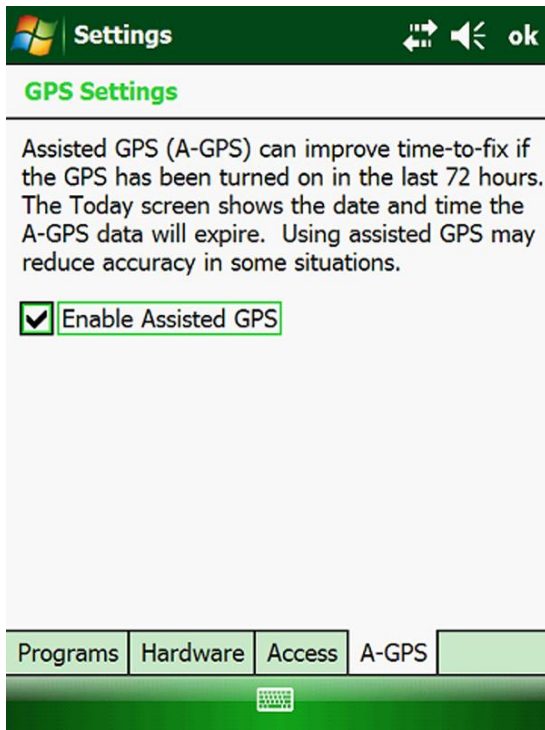
7. Click **OK**. The Settings window displays.

Additionally, if you have Windows Mobile 6.1 (not available on 6.0), you may also turn on Assisted GPS, which may improve your user experience (allows faster, but possibly less accurate, GPS lock).

Turning on Assisted-GPS

To turn on the Assisted-GPS feature, do the following:

1. Click **Start**. The Start dropdown menu displays.
2. Click on **Settings**. The Settings window displays.
3. Click on the **System tab**.
4. Click on the **GPS** icon. The GPS Settings pane displays.
5. Click on the **A-GPS** tab.
6. Check the checkbox **Enable Assisted GPS**. A check mark displays.



GPS Settings A-GPS tab

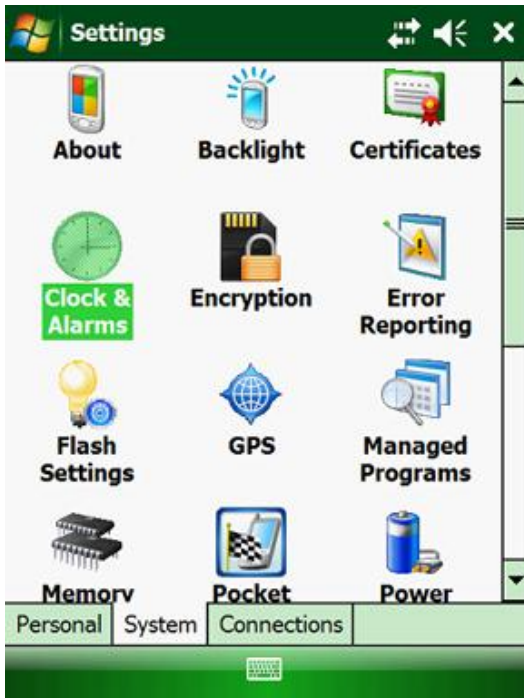
7. Click **OK**. The Settings window displays. GPS metadata in RFID SearchLight is now enabled. You can now restart SatViewer. Please ensure that SatViewer is connecting on COM3.

Setting the Time Zone

WARNING: You **must** set the local time zone before using the RFID SearchLight application. Failure to do this could cause the device not to comply with local RF regulatory requirements. Setting the time zone automatically sets the correct region for your location.

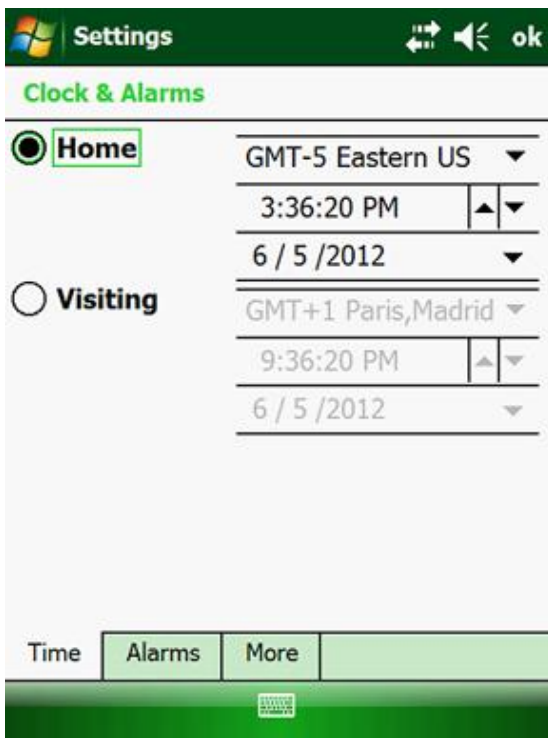
To set the time zone, do the following:

1. In the Start menu, click on **Settings**. This displays the Settings window.
2. Click on the **System** tab.



Settings window, System tab

3. In the System tab, click on the **Clock & Alarms** icon. The Clock & Alarms pane displays.



Clocks & Alarms Pane, Time tab

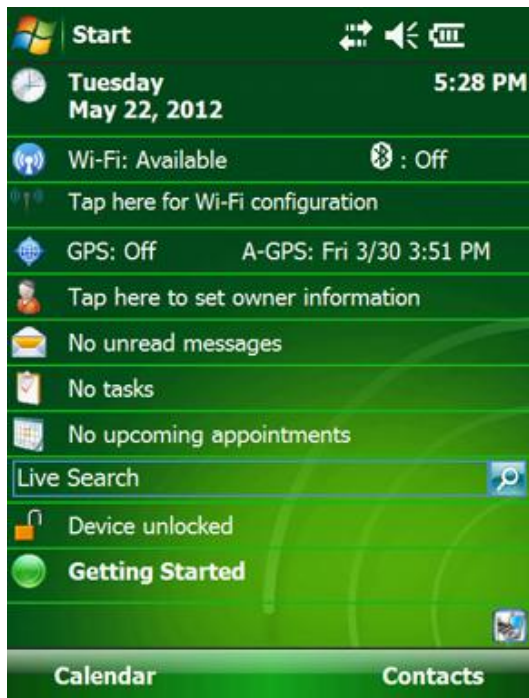
4. In the Time tab, click on the **Home** radio button.
5. In the top right dropdown list, click on the correct time zone for your location.

Using the RFID SearchLight Application

WARNING: Do not suspend the Nomad while actively reading tags.

The following information explains:

- Starting the RFID SearchLight Application from the Windows Mobile Device Center
- Enabling and Disabling the RFID Reader as a Keyboard Wedge
- Configuring the RFID SearchLight Application
- Changing Reader Settings
- Reading Tags



Start window

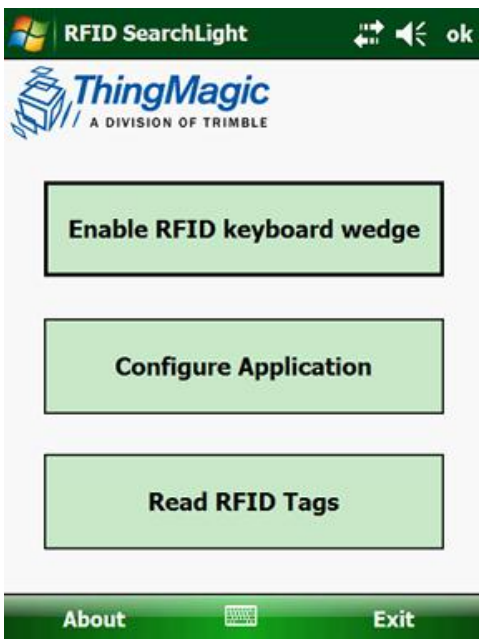
Starting the RFID SearchLight Application

1. In the main window, click on the **Windows** icon or the **Start** button. A dropdown menu displays.



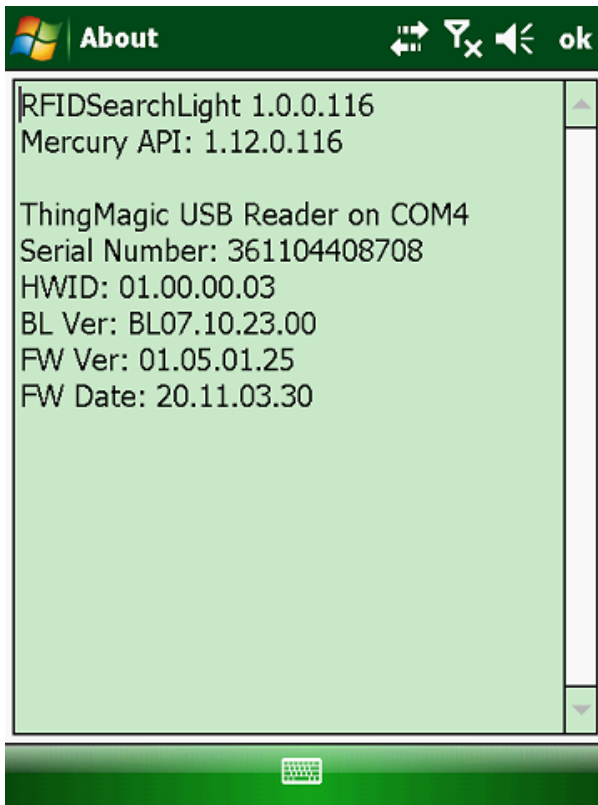
Start window dropdown menu

2. Click on the **RFID SearchLight** menu item. The RFID SearchLight application displays.



RFID SearchLight main window

The About window provides basic hardware and software information about the Nomad RFID Reader. Click on **About** to display this window.



About window

From the main menu, you can:

- Enable/disable the keyboard wedge. All tag information will be send to the active application, such as Notepad, Excel, or Word
- Configure the application
- Read RFID tags

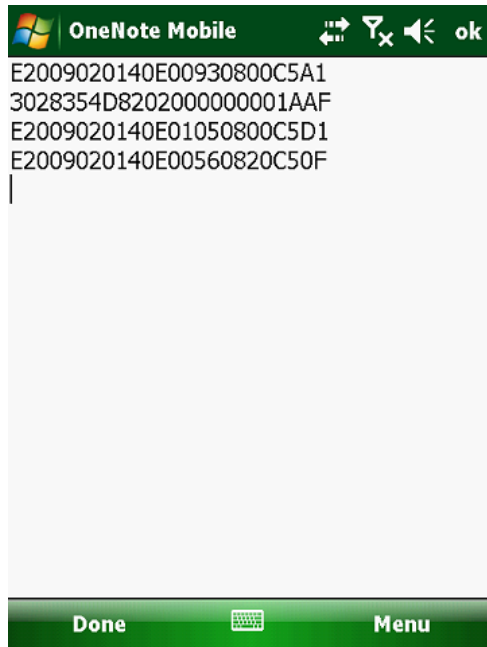
Enabling and Disabling the RFID Keyboard Wedge

Enable the keyboard wedge if you want to send RFID tag reads to a text application such as Pocket Word, Notepad, or Excel. To enable RFID keyboard wedge, do the following:

1. Click on the **Enable RFID keyboard wedge** radio button. A warning message displays.
2. Click **Yes** to enable the keyboard wedge. Click **No** to exit to the main window.

To read tags into a text application:

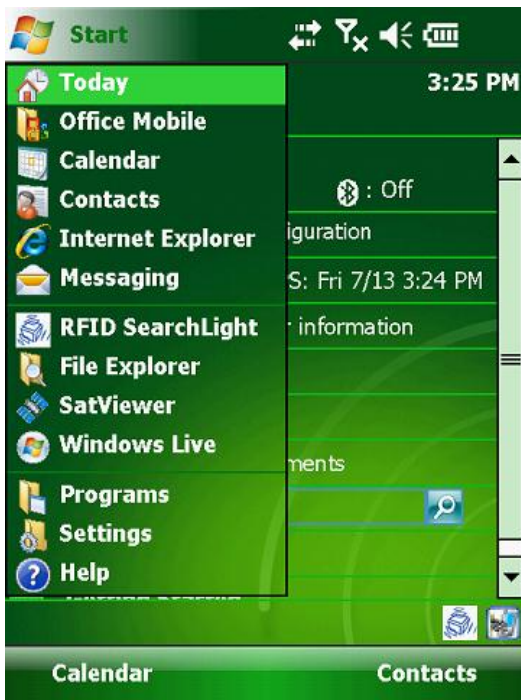
1. Open any text-based program like OneNote Mobile, Notepad, or Excel
2. Press the pre-assigned trigger key which is the **Right Soft Key** and you should see tags in the program. See example below. Please note that this key is not changeable.
NOTE: ScanAgent will not function while the keyboard wedge is active. Both scanner and RFID can be used simultaneously by controlling them via the API.



Reading tags into OneNote Mobile

To disable RFID as keyboard wedge, do the following:

1. Click on the **Disable RFID keyboard wedge** button in the main RFID SearchLight window. You can either use the Start menu or click on the ThingMagic icon on the bottom right hand corner to get back to this screen.



Disabling the Keyboard Wedge

2. Click **OK** to complete this task. The keyboard wedge is now disabled.



Keyboard Wedge disable warning

Configuring the Application

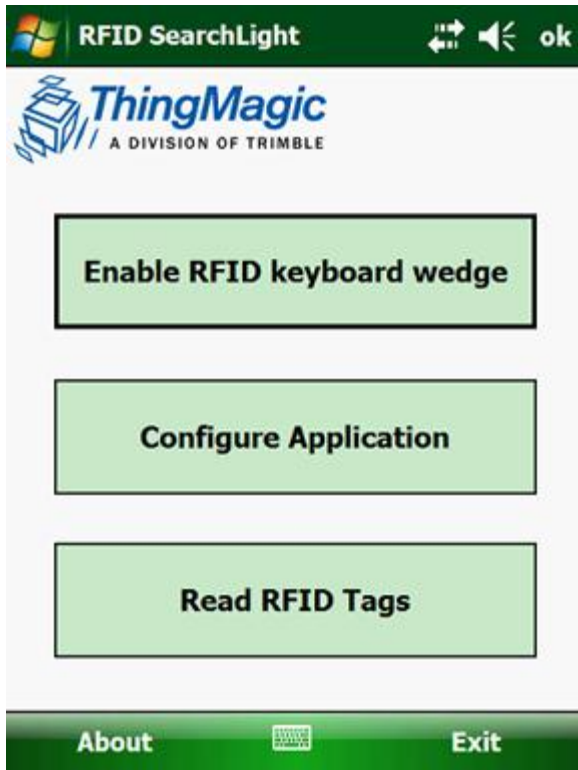
The Configure Application feature allows you to configure the following:

- Display Format
- Read Parameters
- Prefix/Suffix
- Reader Settings

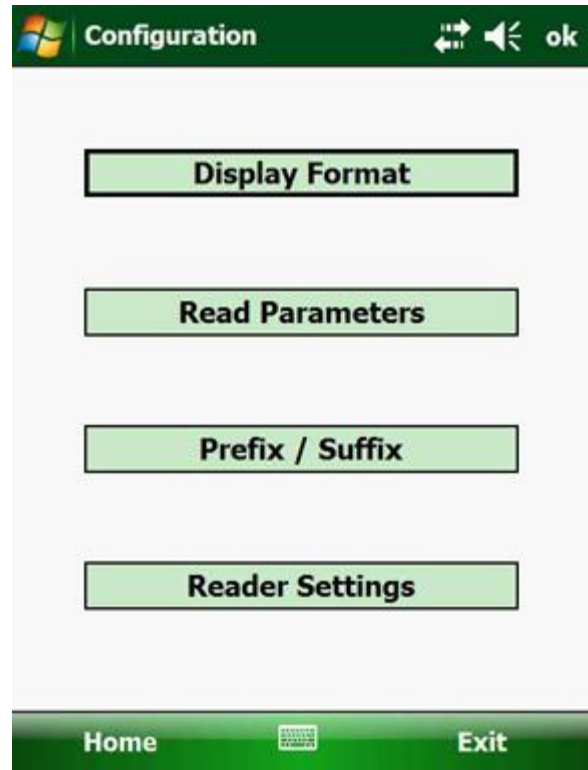
The sections that follow detail how to configure each.

To use the **Configuration Application** window, do the following:

1. Click on the **Configure Application** radio button. The Configuration window displays.



RFID SearchLight main window



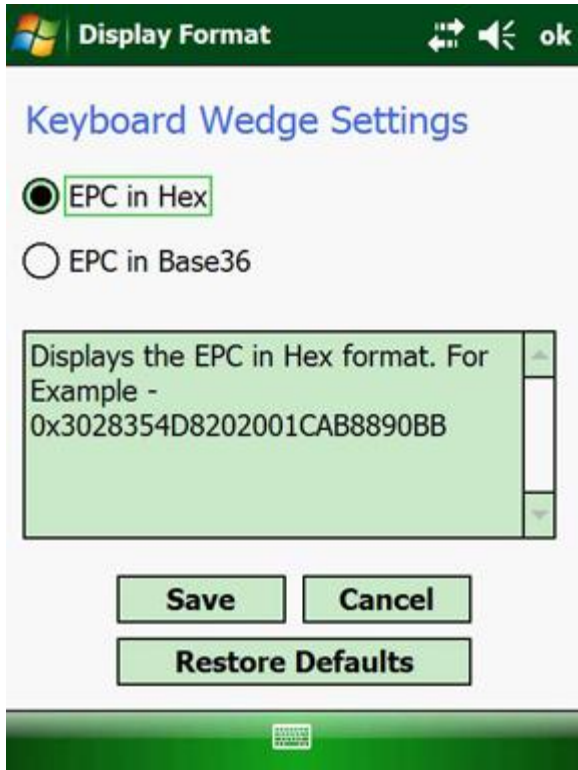
Configuration window

Display Format

The RFID SearchLight Application allows you to display tag reads in either a hexadecimal format or in a Base-36 Alphanumeric format. Please see the image below for examples of these encodings.

To configure the display format, follow these steps:

1. Click on **Display Format**. The following window displays.



Display Format window

EXAMPLE:

EPC in hexadecimal representation:
3028354D8202028000000000

Reverse Base-36 alphanumeric representation for human-readable text:
CHL58FYDITHJ83VN0G1

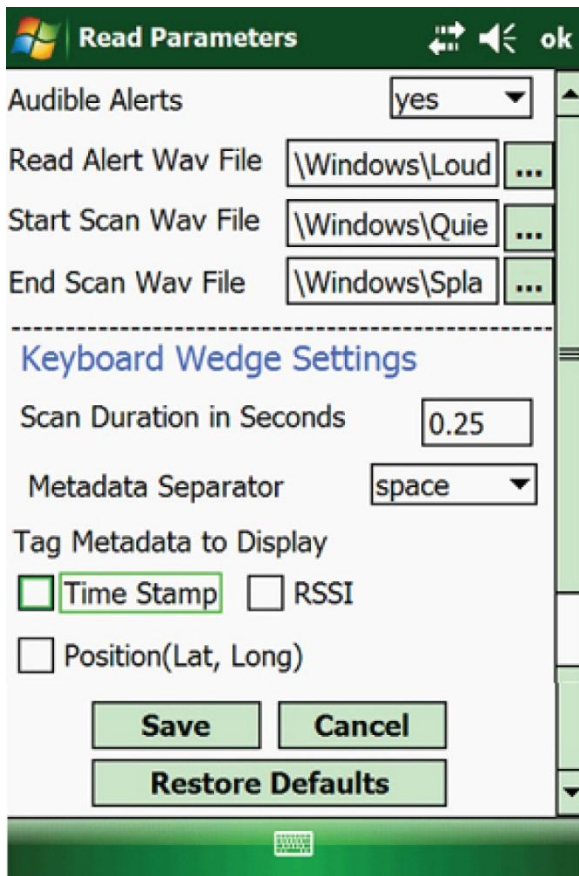
2. Click on **EPC in Hex** or **EPC in Base 36**.
3. Click **Save**, **Cancel**, or **Restore Defaults**.

Read Parameters

Use the **Read Parameters** window to set the path for read alert wav files, start scan wav files, and end scan wav files to use and setting the Keyboard Wedge read parameters: read duration, metadata separator, and tag metadata. The wav files are used to indicate tag reading is enabled, the start of a tag read, and the end of a tag read.

To configure the read parameters, follow these steps:

1. Click on **Read Parameters**. The Read Parameters window displays.



Read Parameters window

Setting Audible Alerts

You may set your own preferred alert sounds using this menu.

NOTE: Use very small WAV files.

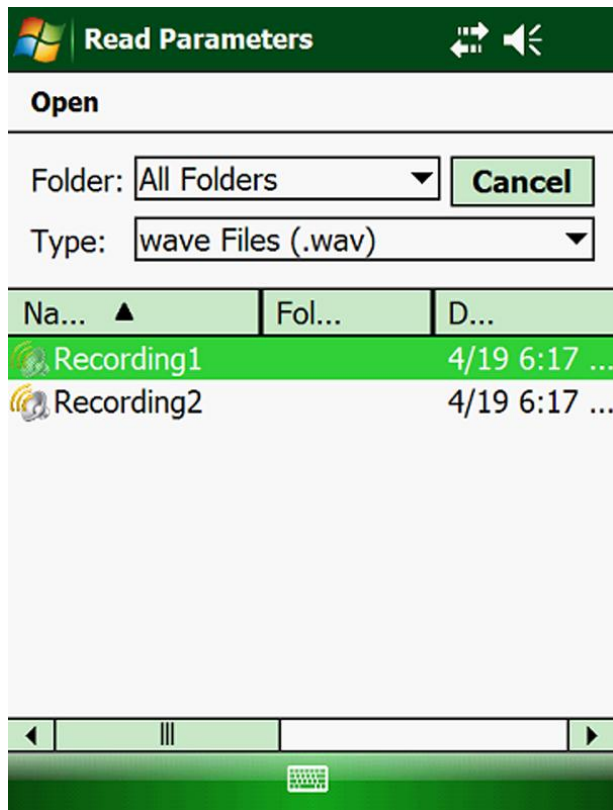
To configure the audible settings, follow these steps:

1. Click on the **Audible Alerts** box. A dropdown menu displays.
2. Click on **Yes** or **No**.

Setting the Read, Start Scan, and End Scan Alert Wav Files

NOTE: Use very small WAV files.

To configure the read, start scan, and end scan alert sounds, browse to the respective file in File Explorer and select it

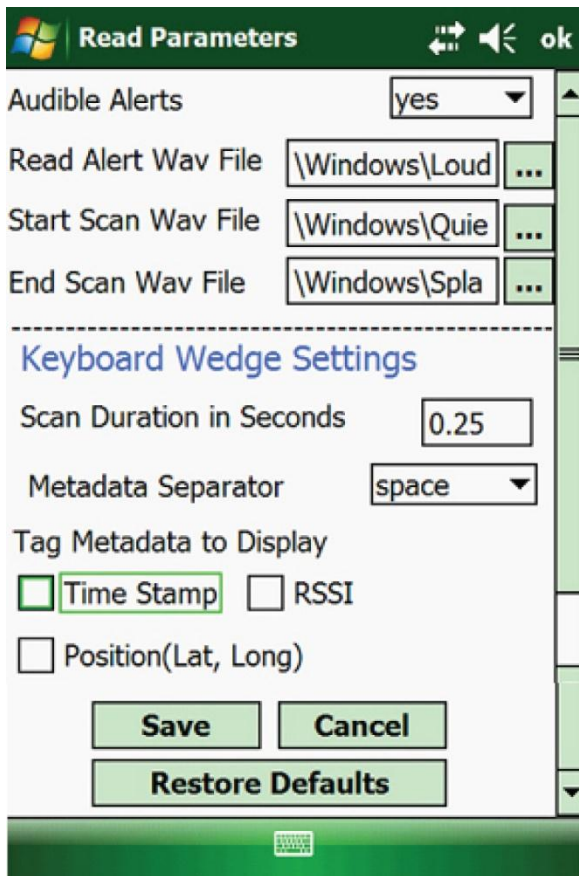


Read Alert Wav File window

Read Parameters Keyboard Wedge Settings

The Read Parameters window Keyboard Wedge Settings lets you set the following:

- Scan duration
- Metadata separator
- Tag metadata to display



Read Parameters window

Setting Scan Duration in Seconds

Click in the text box, then type in the amount of time to allow for a scan, in seconds or fractions of a second. The scan time should be set depending on the number of expected tags. If you are reading a less than 10 tags at a time, you can set the scan time to 1 second. If you are expecting more than a 100 tags, set it to 5 seconds.

Setting a Metadata Separator

1. Click on the triangle in the box. A dropdown list appears.
2. Click on either **Comma** or **Space** to set the metadata separator.

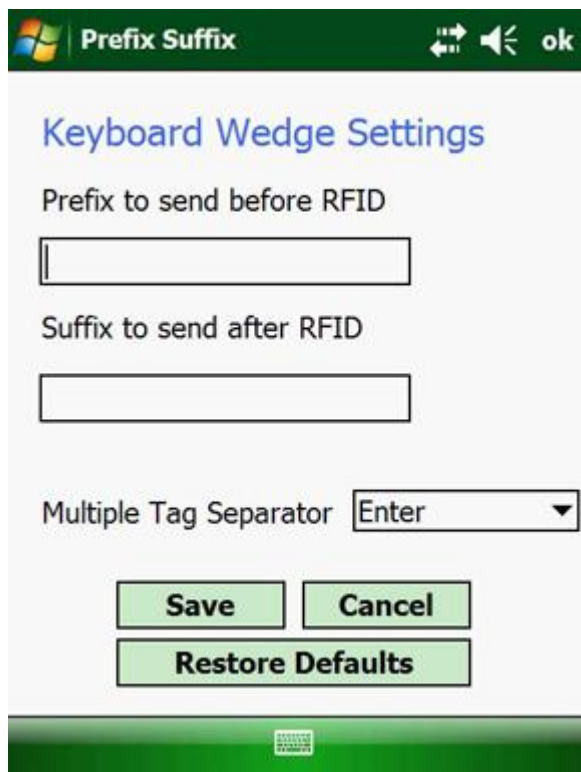
Setting Tag Metadata to Display

Click in the check box or boxes – **Time Stamp**, **Received Signal Strength Indicator (RSSI)**, and/or **Position (Lat, Long)** – for the tag metadata you want to display.

Finally, you may save your changes, cancel your changes, or restore the default settings by clicking on the appropriate button at the bottom of the screen

Prefix/Suffix

The Prefix/Suffix menu allows you to add a prefix and suffix for EPC string.

The image shows a software window titled "Prefix Suffix" with a green header bar. Inside the window, the title "Keyboard Wedge Settings" is displayed in blue. Below this, there are three input fields: "Prefix to send before RFID" (a text box), "Suffix to send after RFID" (a text box), and "Multiple Tag Separator" (a dropdown menu currently showing "Enter"). At the bottom of the window, there are three green buttons: "Save", "Cancel", and "Restore Defaults". The window has a standard Windows-style title bar with a logo, maximize, minimize, and close buttons, and an "ok" button.

Prefix Suffix window

Adding a Prefix

Click on the **Prefix** box and type in a prefix.

Adding a Suffix

Click on the **Suffix** box and type in a suffix.

Selecting a Tag Separator

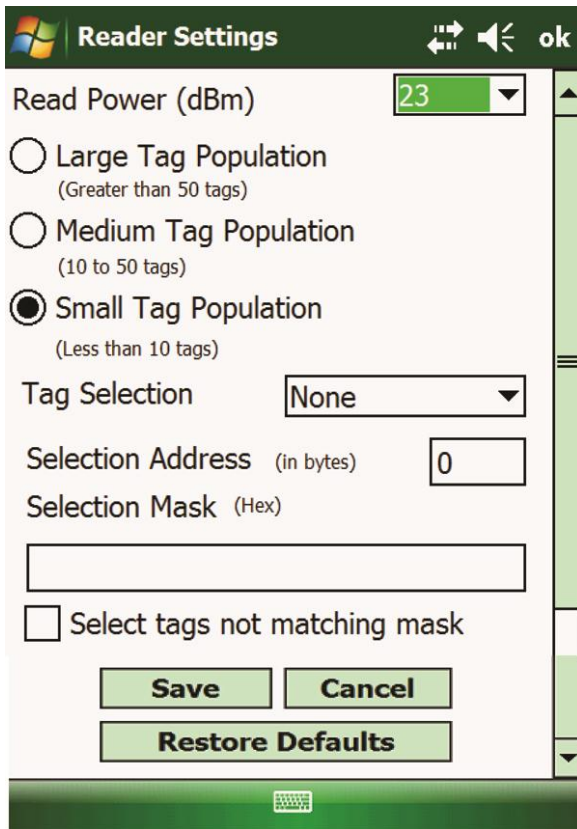
Click on the **Multiple Tag Separator** box. A dropdown box displays. Choose one of the following delimiters: **Comma**, **Tab**, **Space**, or **Pipe**.

Finally, you may save your changes, cancel your changes, or restore the default settings by clicking on the appropriate button at the bottom of the screen.

Assigning Reader Settings

The Reader Settings window is used to set the tag population and filter criteria to filter the tags in the field.

Use this menu to select power settings, tag populations, tag selections, selection address, and other related tasks.



Reader Settings window

1. Click on the **Read Power** box. A down menu displays.
2. Click on the appropriate power setting. Higher values represent longer read distances. 23dBm provides the maximum possible read distance.

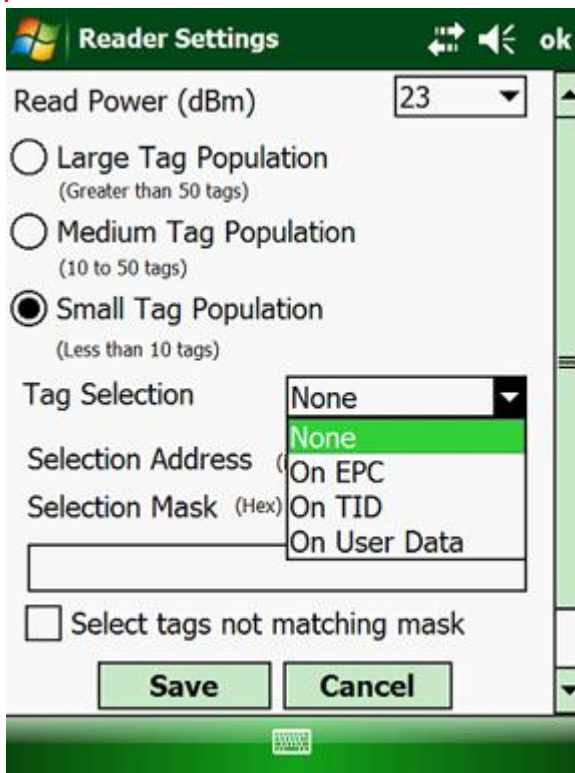
Setting the Tag Population Size

Click on one of the three tag population radio buttons.

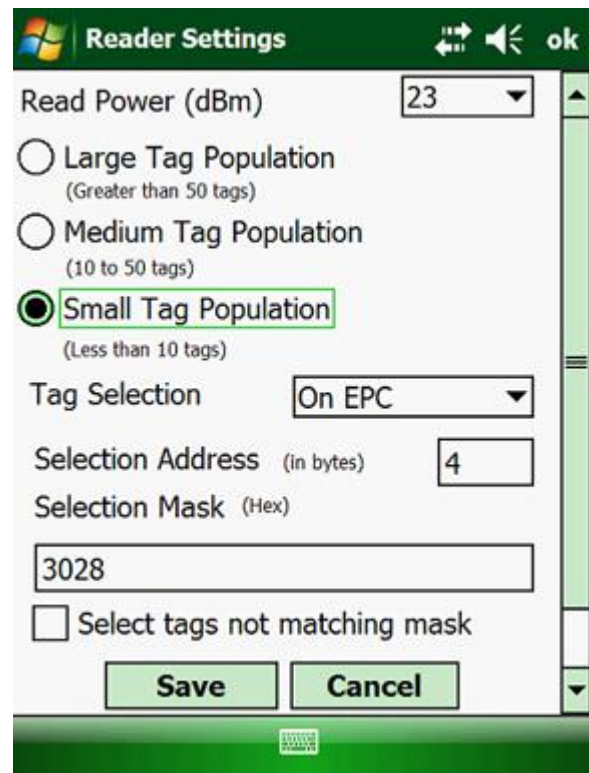
This next section deals with setting the type of tags you want to find (EPC, TIC, or User Data), where in the field you want to start (this requires that you have some knowledge of the field itself before reading the tags), and further limiting the data set to a specific tag or tag numbers (identifiers). Finally, the last option is a checkbox that allows you to invert the data set, that is, you can choose to see the data for the reads not displayed.

Setting a Tag Selection

1. Click on the **Tag Selection** box. A dropdown menu displays.
2. From that menu, click **On EPC**, **On TID**, or **On User Data**.



Tag Selection dropdown menu



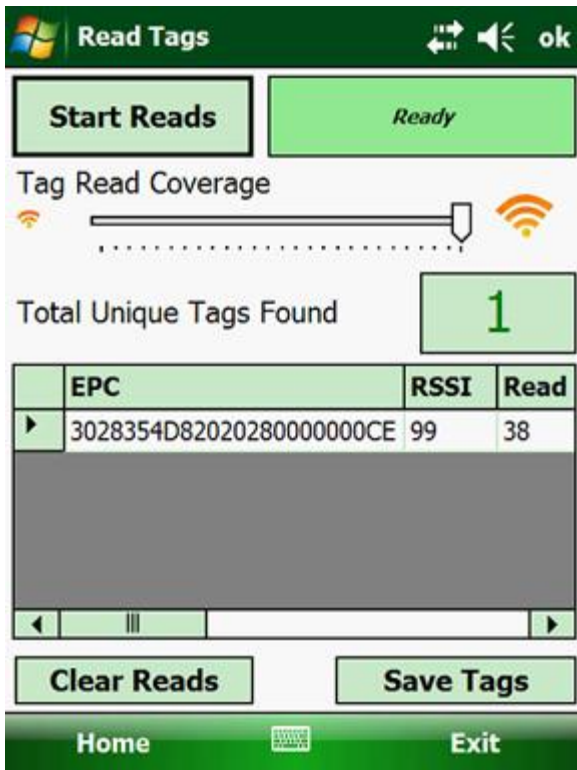
Tag Selection, Selection Address, and Selection Mask set

Setting a Selection Address

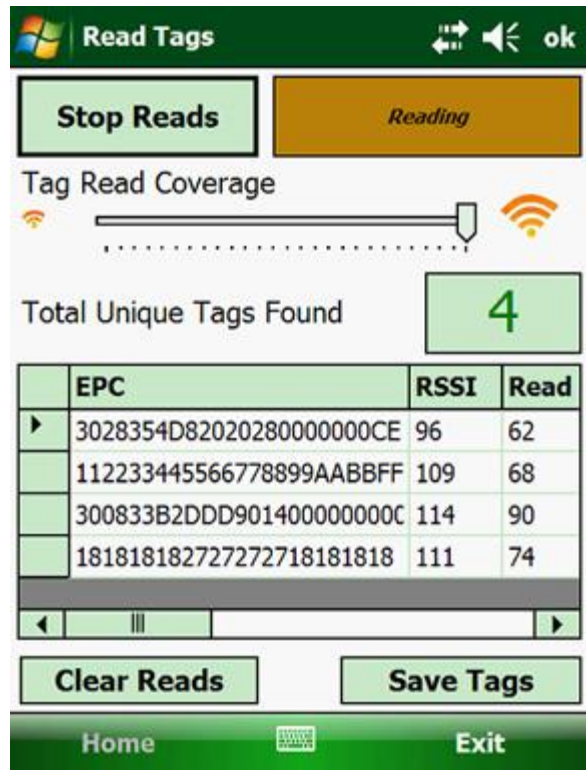
1. Click the **Selection Address** Box.
2. Type in the number of bytes.

Creating a Selection Mask

1. Click on the **Selection Mask**.
2. Type in the selection mask. This selects only certain tags.



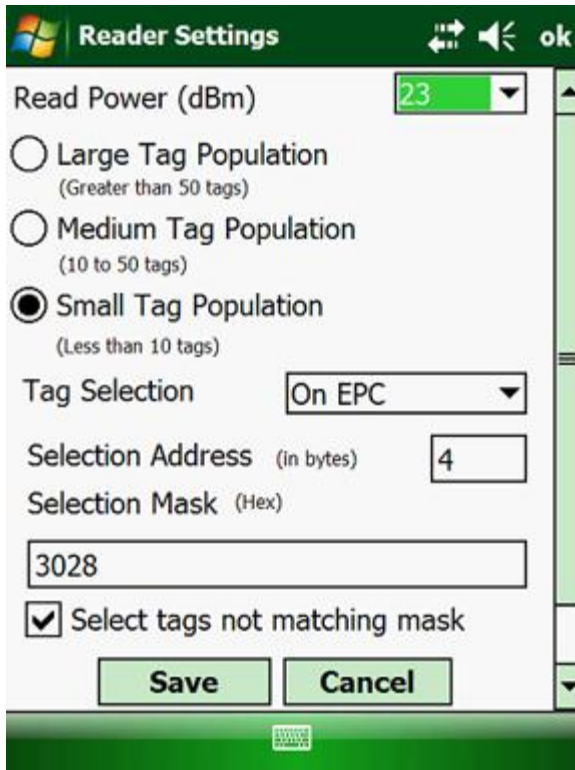
One tag read, which matches the settings



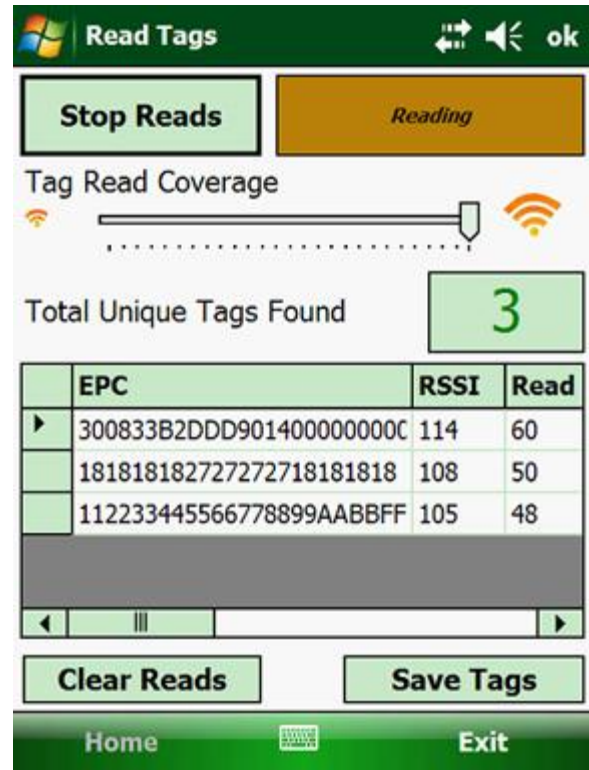
A read showing all tags in the field

Selecting Tags Not Matching the Mask

Click the **Select Tags Not Matching the Mask** check box. Checking this checkbox displays the tags not matching the Tag Selection, Selection Address, and Selection Mask that you just set.



Select tags not matching mask checkbox



Resulting screen showing the non-selected tags

Finally, you may save your changes, cancel your changes, or restore the default settings by clicking on the appropriate button at the bottom of the screen.

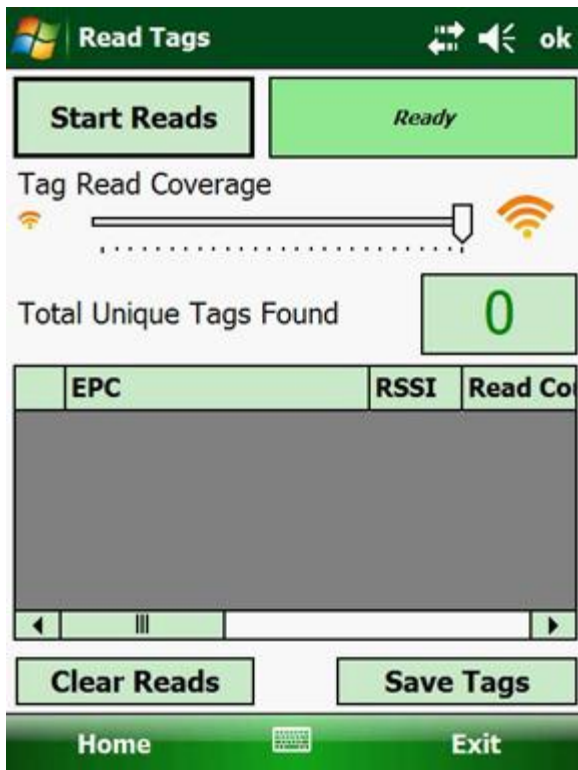
Reading Tags

The Read Tags menu provides for reading and displaying multiple tags. Tags are read based upon the reader settings. Tag read results are based upon filter criteria as defined in Reader Settings window.

WARNING: Do not suspend the Nomad while actively reading tags.

WARNING: Be sure to save your data. If you exit the application or click on the **Clear Reads** button before saving your data, then that data is lost.

NOTE: The tag count can jump from one number to a larger number (e.g., 2 to 7) without going through all the intermediate numbers. This happens when the reader reads multiple tags in a short duration.



Read Tags window

NOTE: The Total Unique Tags Found box lists the number of unique tags read. However, the pane below may list those unique tags as being read multiple times, so the list and the count may NOT be the same.

To read tags, do the following:

Click on the **Start Read** button. The Ready pane to the right changes to Reading. As you read tags, tag data appears in the lower part of the window.

To stop reading Tags, do the following:

Click on the **Stop Reads** button. The pane to the right changes back to Ready.

Setting the Read Coverage distance, do the following:

Adjusting the slider increases or decreases the read distance.

Clearing Reads

Click on the **Clear Reads** button. This deletes all the recently scanned tag data.

EPC	RSSI	Read Count	Time Stamp	Tag Id	Reader Name	Position
3028354D82020280000000DF	104	57	6/6/12 2:05:55 PM	JNL58FYDITHJ83VN0G1	Thingmagic USB	42.363000 -71.087557
3028354D82020280000000B9	83	44	6/6/12 2:05:55 PM	HML58FYDITHJ83VN0G1	Thingmagic USB	42.363000 -71.087557
3028354D82020280000000EA	86	19	6/6/12 2:05:55 PM	UNL58FYDITHJ83VN0G1	Thingmagic USB	42.363000 -71.087557
3028354D82020280000000CF	89	16	6/6/12 2:05:55 PM	3NL58FYDITHJ83VN0G1	Thingmagic USB	42.363000 -71.087557

Read Tags Scrolling Region with Data

Saving the Tag Read Data

Using the **Save** button, you can save the accumulated tag read data. Follow this procedure to save your tag data:

1. In the Read Tags window, click on the **Save Tags** button. The Read Tags Save As window displays.



Read Tags Save As window

2. Using the keyboard, type in a file name.
3. Select a folder from the Folder dropdown list.
4. Select the type from the Type dropdown list: .txt, doc, or .csv.
5. Select the location from the Location dropdown list: Main Memory or SD card (if present).

WARNING: Be sure to save your data. If you exit the application or click on the **Clear Reads** button before saving your data, then that data is lost.

Troubleshooting

1. RFID Reader is not detecting tags
 - a. Ensure that the RFID Searchlight Application is correctly installed.
 - b. Ensure that the RFID Reader is securely plugged in to the USB boot.
 - c. Restart the Nomad
 - d. Make sure that the tag you are trying to read is a UHF Gen2 tag.
 - e. Tags which are directly on metal or on large liquid containers will not typically be readable from a long distance. Please put the RFID Reader in close proximity to the tags.
 - f. Verify reading on tags which are not mounted on metals or on liquid containers.
 - g. Ensure that there are no large metallic objects between the reader and the tags.
2. The “**USB device not found/recognized**” message displays. This occurs when the USB cable is plugged in before installing the RFID SearchLight application or the FtdiVcpinstaller.CAB file is not present or accidentally uninstalled. Please install the application before plugging in the USB cable.
3. RFID Reader is intentionally or accidentally suspended while reads are going on
 - The reader will try to resume reading after it is resumed. In some small number of cases, this is not successful
 - Please restart the Nomad to resume reading.
4. GPS Metadata is not showing up in the GUI or keyboard wedge
 - Ensure that the GPS metadata selector is checked in the **Read Parameters** screen.
 - Ensure that SatViewer, if operational, is connecting on COM3. If it is on COM2, please change this to COM3.

Support

Support for the Nomad RFID Reader is available by contacting:

ThingMagic, A Division of Trimble
Four Cambridge Center, 12th floor
Cambridge, MA 02142
866-833-4069
Support@ThingMagic.com

Or through the company website:

www.ThingMagic.com

Compliance Information

FCC Compliance

This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area.

This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

This device has been designed to operate with the antenna provided with it. This device is not designed to work with any other antennas.

To reduce radio interference to other users, the antenna type and its gain is chosen such that the equivalent isotropically radiated power (EIRP) is not more than permitted for successful communication.

EQUIPMENT MODIFICATION CAUTION

Equipment changes or modifications not expressly approved by ThingMagic, Inc., the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

IMPORTANT USER INFORMATION

In order to comply with FCC and IC requirements for RF exposure safety, a separation distance of at least 20 cm (7.9 in) needs to be maintained between the radiating elements of the antenna and the bodies of nearby persons.